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Waste

Seven Reasons Why Waste Conversion Technology's Promise Is Unfulfilled

Waste conversion technology holds promise, but zero waste to landfill is far off.

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After a decade-long effort and billions of dollars of expenditure, waste conversion technologies (CTs) have yet to fulfill their promise in addressing one of North America's primary environmental goals—reducing the 125 million tons of post-recycled MSW that come to rest in our nation's landfills each year. Here's why:

1. Nothing discourages capital investment more than *federal regulatory uncertainty*. The Renewable Fuel Standard (RFS), the platform that motivated billions of dollars of private sector investment and enabled the development of the first-generation biofuels industry (ethanol and biodiesel), has been under continuous attack in Congress, as have the federal grant and loan guarantee programs that have supported its development. The $1-per-gallon biodiesel tax incentive, vital to the industry, lapsed at the beginning of 2014, was not retroactively reinstated until December, and several weeks later, was again allowed to expire. In mid-April, in settling litigation filed by the petroleum industry, EPA agreed that it would propose biofuels volume requirements for 2015 by June 1,

and finalize its Renewable Volume Obligations for both 2014 and 2015 by November 30. These numbers, which establish the volume of biofuels that must be blended into the nation's transportation fuels under the RFS, are intended to enable producers to plan their production levels so as to comply with these federally mandated targets. Although EPA has now agreed that the 2014 volume requirements will reflect the amount of fuel that was actually used during that year, the announcement came almost two years too late to be of any value. The 2015 numbers are coming almost one year too late. EPA has now committed to announce its RPS (Renewable Portfolio Standard) obligations for 2016 on schedule.

2. *Commodity price instability*: The past year's collapse of petroleum prices, mirrored in the price of natural gas, has impacted waste conversion technology developers as well as first-generation ethanol producers. Vast swings in the price of petroleum, corn, and ethanol, and the value of RINs that track compliance with the RPS have eroded operating margins and discouraged capital investment, and in the past, have caused some first generation biofuels producers to shut down for periods of time. This year's OPEC-orchestrated petroleum price war has not only been an attempt to slow western oil and gas development, it has been a direct attack on the economic vitality of alternative fuels.

3. *Entrenched opposition*: Aided and abetted by the nation's livestock, poultry, and food production interests, the oil and gas industry has spent at least $140 million on lobbying in each of the past six years, protecting deep federal subsidies for petroleum, while blaming biofuels for everything from global warming, to increasing food prices. Attempts to break through the E10 blend wall have led to an infrastructure standoff, with the major oil companies resisting the installation of E15 and higher ethanol blender pumps and advocating the repeal of the RFS.

4. *Price Competition*: Natural gas prices, which are expected to remain depressed over the next decade, have made low-priced fuel and electric power accessible in much of the nation. Further, as opposed to Europe and Japan, landfill capacity and acreage for expansion remains plentiful, keeping tipping fees within reason throughout much of the country. Last February, Plasco Energy, after investing almost $400 million in its process

over 10 years, filed for bankruptcy. According to court documents, Plasco Group engineers "concluded that certain aspects of the conversion system needed to be redesigned in order to sustain commercial operating performance on an economically viable basis…." Concern about "its ability to operate at commercial levels and to convert both wet and dry waste continuously," and an economic model that relied upon high tipping fees and electric power prices, had long hampered the company's ability to take the technology beyond the demonstration stage.

5. *Consistent, homogenous feedstock* is critical to the MSW conversion process. Conquering this single complexity has slowed commercialization and even defeated some of the industry's most promising technologies. The production of uniform refuse derived fuel is often a necessary intermediary step between recycling and gasification. In mid-2014, INEOS Bio reported that, since completing construction of its $130 million Vero Beach facility two years earlier, "very little fermentation or production of ethanol from the production fermenter had occurred, due in large part to the sensitivity of the bio-organisms in the fermentation process to high levels of hydrogen cyanide in the syngas." Design modifications, including the installation of HCN scrubbers, resulting from challenges encountered during commissioning have delayed nameplate level operations for almost three years. And, this has occurred with cellulosic wastes. Mixed MSW has yet to be introduced. As early as 2012, Coskata, which was founded on the premise of MSW conversion, switched its feedstock strategy to natural gas.

6. *Feedstock aggregation*: Firm feedstock and offtake agreements, contracts for 10 years of more, are normally required for debt financing. Due to the diversity of haulers and waste management contracts in the nation's major markets, MSW feedstock agreements for more than 400 tons per day can be difficult to achieve. The opportunity for waste conversion technology projects appears to rest in smaller to mid-sized communities, where projects can be developed with individual waste management companies or through public-private partnerships. In years past, to stimulate the introduction of recycling, local governments and the waste management industry integrated the cost of separating and recovering selected commodities from the MSW stream into the fees they charged to their customers. However, no provision has ever been made for the further

recovery and pre-processing of MSW residuals (i.e., RDF units on the back of MRFs) prior to final disposal. The production of uniform feedstocks for biorefineries, established as part of and financed by local IWM systems would go a long way to lifting one of the major technical and economic burdens being experienced by emerging bioindustries. For this to happen, the environmental benefits of such a program would need to be universally recognized by both policy makers and environmentalists, as was the case for traditional recycling. To date, vested interests have effectively prevented this from happening.

7. *State regulatory uncertainty*. A number of state governments, most notably California, have been unwilling to provide developers with a feedstock-driven, technology neutral waste conversion playing field. Although energy recovery or the production of biofuels and biobased chemicals may be a higher and more profitable use of MSW than can be achieved in traditional recycling, this alternative does not appear in many waste hierarchies, nor is this given credit for landfill diversion.